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Using Social Network Analysis to Examine Leadership Capacity within a Central Office Administrative Team

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Abstract. The purpose of this study was to investigate the ways in which Social Network Analysis (SNA) could inform leadership capacity within a small, Midwestern school district. Four findings were identified. The first was that hierarchical or formal structures continue to hold sway within educational institutions. The second was that "birds of a feather" or people of common interest or equivalent status within the hierarchy do indeed flock together. The third was that collaboration, trust, and transparency are inter-dependent and undergird capacity. The fourth was that social networks *are* the organization, making SNA an essential diagnostic and decision-making tool. The findings led to a number of implications for practice, which were framed by Information Age imperatives arising from the literature.

Keywords: Leadership; Social Network Analysis; Leadership Capacity; Social Networks; Educational Leadership

1. Introduction

Outdated organizational models and simplistic conceptions of leadership limit the ability of school leaders to tackle the thorny issues they face on a daily basis in the 21st Century (Bolman & Deal, 2003; Yukl, 2012). Theories of leadership suggest that new conceptions are essential if these problems are to be solved (Martin, 2007). These new conceptions must account for more collaborative and networked ways of making sense of things (Drath, 2003; Kelly, 2003). This study, framed by interrelated theories, among them constructivist leadership, leadership capacity, and social networks, sought to employ an Information-Age tool—social network analysis—to examine leadership and ways to expand its capacity within the administrative team of a district central office. The following

research questions guided this inquiry: 1) What does social network analysis (SNA)—to be referred to as measures of connectedness—reveal about the nature of leadership capacity within the administrative team of a district central office? 2) How does leadership capacity—as measured by Lambert's Leadership Capacity School Survey—inform the outcomes of the SNA and vice versa? 3) How do the SNA results affect attitudes of the district's senior leadership concerning ways of working, organizing, interacting, and enhancing leadership capacity within the district? 4) How do the SNA results affect attitudes of the district's senior leadership with regard to solving its most intractable problems?

2. Conceptual Underpinnings of the Study

Embedded in the discussion of the evolution of organizational and leadership theories were complexity theory and social network and small world theories, which expanded the possibilities for understanding leadership capacity, particularly through the use of Social Network Analysis or SNA (Andriani & Passiante, 2004; Barabási, 2002; Bar-Yam, 2004; Bolman & Deal, 2003; Cilliers, 2004; Cross & Parker, 2004; Lambert, 2002, 2003; Morgan, 1997; Wasserman & Faust, 1994; Watts, 2003).

2.1 Organizational and leadership theories

Theories of organizations and of leadership tend to follow the prevailing philosophical orientation of both society and the researchers (Yukl, 2012). Thus, in the early years of analysis, organizations were viewed through a positivist lens as fixed entities that could be dissected and studied empirically to determine what made them tick. From this epistemological framework arose the first theories of organization and leadership, namely structuralism and scientific management (Foster, 1986). As positivist and structuralist views yielded to constructivist, post-structuralist and post-modernist views on the nature of reality and truth, theories of organizations and the leadership needed to govern them have become more complex (Bensimon, Neumann, & Birnbaum, 1989).

Morgan (1997) argued that theory is, at its root, a metaphor through which humans understand the world about them. More complex theories of organizations and leadership, which are needed to deal with both vexing problems and intriguing possibilities, are made possible only when ways of seeing are complicated, either within themselves or in combination (Bolman & Deal, 2003).

2.2 Constructivist leadership theory

As its name implies, constructivist leadership theory emanates from a phenomenological worldview in which meaning arises–or is constructed–through what Wilson (2002) termed intersubjective—or shared—experience. "Whatever meaning we create has its roots in human actions, and the totality of social artifacts and cultural objects is grounded in human activity" (¶ 14).

Constructivist theory views leadership as a dimension of the entire organization "beyond person and role and embedded in the patterns of relationships we will refer to as 'reciprocal processes'" (Lambert, 2002, p. 42). These reciprocal

processes subsequently "enable participants in an educational community to construct meanings that lead toward a shared purpose of schooling" (p. 42). Leadership is strongly tied to learning and "addresses the need for sensemaking, for coherence, and for seeing educational communities as growth-producing entities" (p. 35).

2.3 Leadership capacity

Within the context of education, Lambert (2003) posited that "real communities ask more of us than merely to gather together; they also assume a focus on shared purpose, mutual regard, and caring, and an insistence on integrity and truthfulness" (p. 4). From this conviction arises the notion of leadership capacity, which Lambert (2005) defined as "broad-based, skillful participation in the work of leadership that leads to lasting school improvement." Capacity is therefore framed as the intersection of degree of participation and degree of skill, with low capacity schools scoring low in both dimensions and high capacity schools scoring high in both.

While broad-based and skillful participation characterizes a high-capacity organization and lessens the need for command-and-control leadership, formal leaders still play a critical role in fostering and sustaining capacity (Lambert, 2003). Most especially, they facilitate the creation of a shared vision and the conversations necessary to grow capacity.

2.4 Complexity theory

Viewed another way, capacity is complexity or the ability to increase connections and reciprocal relationships, an essential tenet of constructivist leadership (Lambert, 2002). Bar-Yam (2004) noted that a hierarchical organization can be complex but only as complex as the person in charge. In an ambiguous and indeterminate world, the capacity of one individual becomes insufficient to deal with the challenges confronting human collectives. "Complex challenges make it virtually impossible for an individual leader to accomplish the work of leadership, and individual leadership therefore reaches a distinct limit in the face of complex challenges" (Drath, 2003, p. 5).

The law of requisite variety posits that a complex environment demands a complex organism, which is comprised of not just a single brain but many brains (Andriani & Passiante, 2004; Bar-Yam, 2004, Kelly, 2003; McKelvey, 2004; Morgan, 1997), what McKelvey (2004) terms "distributed intelligence" (p. 41) and Kelly terms "hive mind" (Chap. 2, Asymmetrical invisible hands, ¶ 6). The value of complexity theory is that it provides a means to discover underlying order within highly diffuse and diverse organizations.

2.5 Network and small world theories

Capacity speaks to the ability to harness communities to achieve common purpose (Lambert, 2005). Yet anyone who exists within such communities knows that they are complex hives of social interaction that often resist attempts to control and synchronize them (Drath, 2003). To build capacity, Lambert (2003) advocated creating structures for broad-based participation. She stated that "full

participation is first and foremost a function of design" (p. 18), which overlays a structuralist framework onto a post-structuralist vision of leadership. This inherent dichotomy is precisely the message that emerges from social network theory. Structure and chaos, complexity and simplicity, robustness and fragility are not polar opposites or mutually exclusive; they coexist in complex systems (Barabási, 2002; Bar-Yam, 2004; Watts, 2003).

What network and small world theories suggest is that capacity is both a function of formal design and structure (think hierarchical organizations) and informal networks that exist or co-exist within the formal structure but, until recently, have not been understood in a systematic way. According to Krebs (1996), organizational charts are prescriptive when it comes to work processes and information flow; as such, they fail to capture a "complex web of informal interactions" that exists on a subterranean level within the formal structure (p. 397). Illuminating these informal interactions through Social Network Analysis (SNA) becomes essential "in order to identify not only clear breakdowns in cooperation and sharing but also opportunities to strengthen viable but imperfect elements of the 'collaborative fabric'" (p. 397).

2.6 Social network analysis

The means to illuminate these webs of interactions is made possible through social network analysis (SNA). Social network analysis blends quantitative and qualitative methods to examine an organization in terms of its "patterns or regularities in relationships among interacting units," most especially people (Wasserman & Faust, 1994). Wasserman and Faust noted several characteristics fundamental to SNA. First, actors and actions are considered interdependent, rather than as autonomous. Second, ties exist among these actors, which are channels for the transfer of material and non-material resources. Third, the network structure that exists between and among actors provides both opportunities for and constraints on individual action. Fourth, SNA models network structure that is viewed as lasting patterns of relationships among actors (lasting does not mean unchanging; structures will change but there will always be a structure of relationships that exists among actors).

Social network analysis offers a unique means to explore informal (and often invisible) networks within organizations, which are increasingly recognized as critical to the way organizations really function and optimize performance (Cross & Parker, 2004). For the purposes of this study, social network analysis was viewed as a way to explore complexity and capacity-building features that otherwise would be missed in an educational organization.

3. Methodology

3.1 Rationale for use of case study design

Social network analysis (SNA), as an evaluative approach to visualizing and examining organizations, has broad applicability. Yet each SNA is unique to the organization it maps or x-rays, making SNA case-dependent. For this reason, a case-study approach was employed in this study. Merriam (1998) concluded that

the "single most defining characteristic of case study research lies in delimiting the object of the study, the case" (p. 27).

The researchers initially wrestled with whether this study was more appropriately a phenomenological one because social interaction can be viewed as an essential quality of all organizations, and phenomenological studies seek to explore the *essence* of shared experience (Fraenkel & Wallen, 2003). But this study does not so much seek to describe and bracket the essence of *social-ness* within a central office administrative team as it does to map and analyze its manifestation in this specific case.

3.2 Participants

For this study, the unit of analysis was a medium-sized public school district located in the Midwest. This district was chosen purposefully. The participants were the personnel assigned to this school district's administrative team (all central office personnel plus school principals). The sample of the study was every person that comprised this team, minus those who opted out (N=15).

3.3 Instrumentation

Several data collection instruments were used in this study. These included: (a) individual and small group interviews; (b) a hybrid subject-informant survey, the SNA survey; and (c) Lambert's (2003) Leadership Capacity School Survey (LCSS).

Several semi-structured interviews (Merriam, 1998) were employed. The first was an interview with the superintendent. The second was an electronically-delivered interview with the remaining senior leaders, comprised of the deputy and assistant superintendent, and building principals. The third was a group interview with this entire group.

Social network analytic (SNA) tools rely on data sets of binary social interactions. These are captured through a questionnaire that required all participants to identify specific other actors with whom they have the kinds of interactions under scrutiny. Sample questions included: (a) To whom do you typically turn for help understanding and implementing the district's vision and mission? (b) With whom do you typically collaborate to align what the district does each day with this vision? (c) To whom do you typically turn for fresh ideas and innovation?

Lambert's *Leadership Capacity School Survey* (LCSS) is a subject survey that was modified to make it appropriate to a district administrative team. Pierce (2007) found the LCSS to be highly reliable, especially when used for self-assessment and collaborative reflection.

3.4 Data Analysis

The researchers began by mining the transcript of the interview with the superintendent, using data codes not only to help shape the SNA survey but also to detect phrases and concepts that centered on leadership capacity. This was

followed by analysis of the data collected from the SNA survey and LCSS. The researchers primarily focused on assembling the data in such a way that it led to productive and meaningful conversations during the group interview. Later, the researchers returned to the survey data to clarify insights that emerged from the group interview discussion.

4. Presentation and Analysis of Data

The results of the SNA survey were entered into the Organizational Risk Analysis (ORA) software and yielded a series of network maps (using the software's embedded visualization feature) that were employed to facilitate and spur discussion among the district's senior leaders. These maps were anonymized in order to protect the identities of the participants; thus, no explicit correlation was made between the code and the person or specific position it represents. However, based on the literature review and insight that within networks *birds of a feather flock together* (Krebs & Holley, 2006, p. 4), the researchers differentiated the codes into three subgroups. Those nodes representing Central Office Administrators (superintendent, deputy superintendent, and two assistant superintendents) were designated with a COA code. Those nodes representing Central Office Supporting Staff (administrative assistants) were coded as COSS. Finally, those nodes representing Building Administrators were coded as BA.

The ORA software application is freeware available from the Center for Computational Analysis of Social and Organizational Systems (CASOS), a center within the Institute for Software Research, School of Computer Science, Carnegie Mellon University. As the User's Guide states, "Networks are ubiquitous. Everyone and everything is constrained and enabled by the networks in which they are embedded" and everyone typically belongs to multiple networks, a fact for which ORA accounts (Carley, Columbus, DeReno, Reminga, & Moon, 2008, p. 10). The ORA application allows for robust and intricate network analysis far beyond the scope of this study but available to support expanded SNA research within the educational domain.

To recap the process involved, participants were given a set of questions that asked them to identify other members of the staff with whom they interacted in specific situations. A list of all members of the network was included and participants annotated those boxes beside the names that applied. For example, when asked who he considers his friends, Actor A might select Actors C, F, G and H. A spreadsheet was then created for each question, compiling all such actor-to-actor interactions, which looked like that in Figure 1. A "1" in the box indicates an interaction was identified, while a "0" indicates no interaction was identified.

	Actor A	Actor B	Actor C	Actor D	Actor E	Actor F	Actor G	Actor H
Actor A	0	0	1	0	0	1	1	1
Actor B	1	0	1	0	1	0	0	0
Actor C	0	0	0	1	1	0	0	1
Actor D	1	1	1	0	1	0	0	1
Actor E	0	0	1	1	0	1	1	0
Actor F	0	1	0	0	1	0	1	0
Actor G	0	1	1	1	0	1	0	0
Actor H	1	1	0	0	1	1	1	0

Figure 1: Example of ORA data input. [Note: The yellow diagonal highlights that an actor cannot interact with him or herself.]

Network visualizations or maps were then created for each question and other visualizations created to examine the correlation with Lambert's (2003) Leadership Capacity School Survey, as well as to reveal metrics unique to network analysis, such as Closeness Centrality. In all, the researchers created 22 such maps. Three examples will be examined in this paper in order to demonstrate how ORA visually displays data.

In the sample figures that follow, a consistent color coding is employed. Central Office Administrators (COA), consisting of the superintendent, deputy, and assistant superintendents are represented by blue dots. Building Administrators (BA), consisting of the school principals, are represented by green dots. Finally, the Central Office Supporting Staff (COSS), consisting of administrative assistants, is represented by red dots.

For the first set of maps in the study, the title of each figure is comprised of a keyword identifier for that network based on the core attribute being examined. For example, Figure 2 is titled Vision network. Other networks examined such attributes as collaboration, trust, unvarnished truth, hope, courage and friendship.

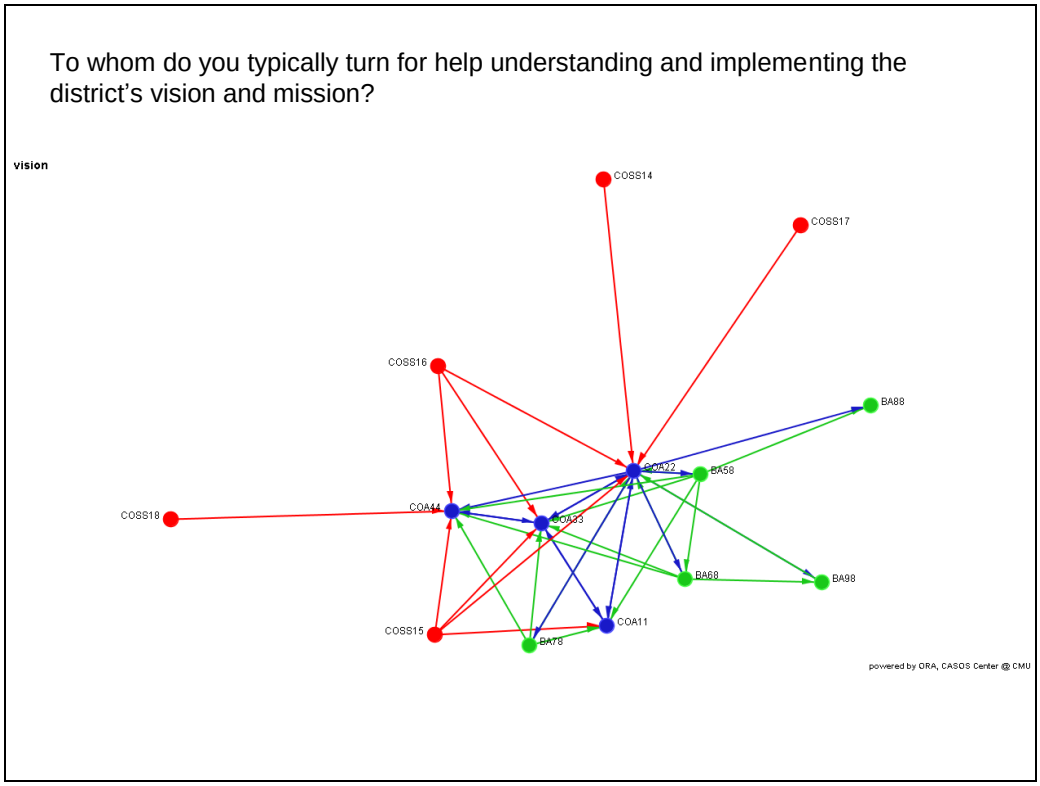

Figure 2: Vision network depicting social interactions related to vision and mission. [Note: COA are represented by blue dots; BA by green dots; COSS by red dots. Arrows reveal the direction of interaction.]

Figure 2 depicts interactions related to understanding and implementing the district's vision and mission. COA personnel turned primarily to each other, although in some instances COA also turned to BA. BA turned primarily to COA but also each other. Of note, COSS turned exclusively to COA. Some turned only to a single COA, while others turned to multiple COA. There were no isolated nodes (isolates) within this network.

A stated intention of the study was to examine ways in which SNA might influence or foster the expansion of leadership capacity. Thus, visualizing the relationship between the results of the SNA survey and Lambert's (2003) Leadership Capacity School Survey was a means to foster discussion and discovery about how social networks and capacity are inter-related. Figure 3 reveals the ORA output showing one possible means to relate the two. The first aspect of the visualization to note is that it represents a combination of the Vision, Collaboration, and Innovations networks which ORA has the capability to perform. These three networks were chosen because each correlates to a construct within the LCSS (vision = focus on vision; innovation = reflection and innovation; and collaboration = shared governance). This composite network, therefore, reveals connections that might shape leadership capacity. Because of this fact, the researchers employed it as the default network for all subsequent visualizations.

The second aspect of this visualization to note is that each node or actor has been color coded to reveal his or her score on the LCSS. The LCSS seeks to measure leadership capacity within an organization. Using a scale of 1 to 5, where 1 represents "We do not do this at our organization," 2 represents "We are starting to move in this direction," 3 represents "We are making good progress," 4 represents "We have this condition well established," and 5 represents "We are refining our practice in this area," respondents scored four constructs: Intense Focus on Vision, Reflection and Innovation, Shared Governance, and Monitors and Responds to Staff Achievement.

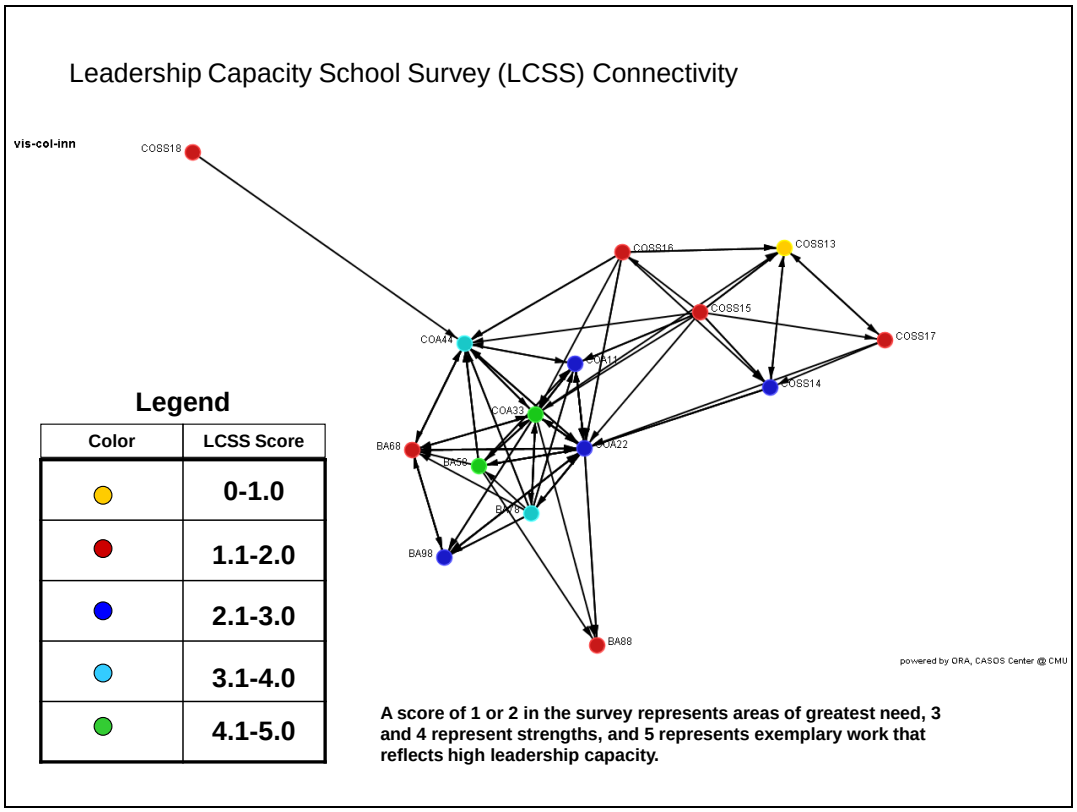

Figure 3: Relationship between Social Network Analysis of the combined Vision-Collaboration-Innovation network and results of Lambert's Leadership Capacity School Survey. [Note: This visualization kluges the Vision, Collaboration, and Innovation networks, as these dimensions comprise three of the critical constructs within Lambert's (2003) LCSS.]

While network visualizations can reveal who is connected to whom, they cannot always reveal with clarity the strength of those connections, or how central a person is to the network, or how far one actor is from another (within the typography of the network map). These quantitative details help to enrich understanding of the network and inform decisions that might improve network performance (Carley, Columbus, DeReno, Reminga, & Moon, 2008; Cross & Parker, 2004; Krebs, 1996, 2008).

ORA has the capacity to calculate and visualize over 100 such measures (Carley, Columbus, DeReno, Reminga, & Moon, 2008). These specific measures were chosen in consultation with Mr. Jeff Reminga (personal communication, May 21,

2009) who also authored the boxed definition. Some of the more common measures include Boundary Spanner, Clique Count, Betweenness Centrality and Total Degree Centrality. Only one, Closeness Centrality (Figure 4), will be presented here.

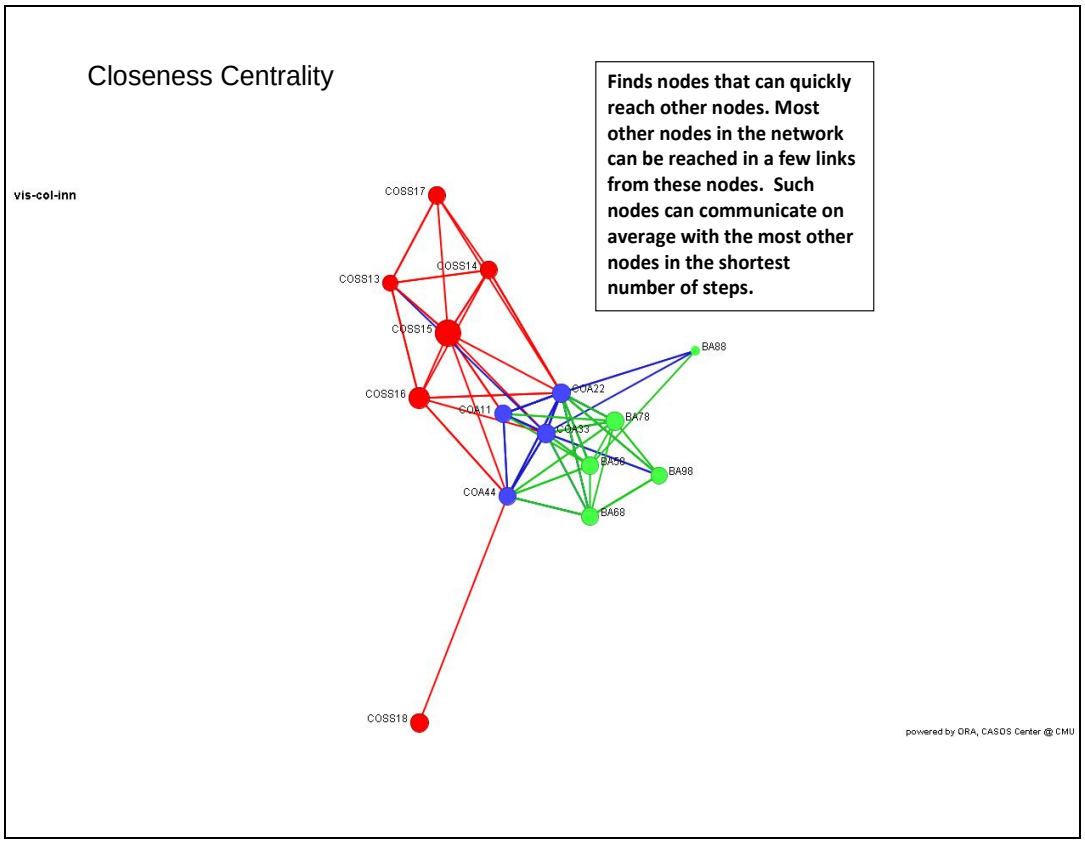

Figure 4: Closeness centrality. [Note: COA are represented by blue dots; BA by green dots; COSS by red dots. The larger the node, the higher the closeness centrality and the ability of that node to connect to the most other nodes fastest.]

Closeness Centrality assesses nodes based on their "distance" to other nodes. Nodes with higher closeness centrality are able to connect to other nodes in the network through the fewest number of steps. In this case, COSS15 has the highest closeness centrality, enabling it to link to more nodes in the network faster (in the fewest steps) than any other node.

4.1 Integrating themes

From this data emerged a number of inter-related patterns and themes. The researchers realized that these themes emerged not only from the expected source of the interview transcripts; they also emerged from the Organizational Risk Analyzer (ORA) network maps. Finally, they emerged from field observations that occurred throughout the study. Each source of theme data informed the other.

The most compelling of these themes arose from the ORA network visualizations and the conversations that the district leadership had as they collectively viewed each one. They included a consistent, yet seemingly

contradictory, pattern of *fragmentation* and *isolation* while simultaneously exhibiting a pattern of *flocking* or *cliquishness* among sub-groups. These two themes complemented four integrating themes that arose from all data sets.

These four integrating themes were framed in oppositional terms because they emerged as much through their negative manifestation as their positive, much like an x-ray can be revealing, if not more so, than the object it captures. These themes included *vision* as opposed to managed programs; *collaboration* rather than isolation and fragmentation; *trust* instead of suspicion and avoidance; and *transparency* versus opaqueness and guardedness.

4.2 Analysis in relation to study questions

Because SNA is relatively new, the ways in which it can inform leadership capacity have received little attention. This study sought to examine capacity more descriptively and holistically as an organic dimension of school communities, with particular focus on the district administrative team. Social Network Analysis held the exploratory promise of unlocking leadership capacity and served as a catalyst to answer the four posed research questions: 1) What does SNA reveal about the nature of leadership capacity within the administrative team of a district central office? 2) How does leadership capacity, as measured by the LCSS, inform the outcomes of the SNA and vice versa? 3) How do the SNA results affect attitudes of the district's senior leadership concerning ways of working, organizing, interacting, and enhancing leadership capacity within the district? 4) How do the SNA results affect attitudes of the district's senior leadership with regard to solving its most intractable problems?

The SNA maps and data revealed that within the school district, leadership capacity was inhibited. Issues of trust, willingness to collaborate, lack of reciprocity, and isolation of both individuals and sub-groups resulted in a strong tendency among sub-groups to operate within their own circles.

With regard to the relation between SNA and LCSS, the data revealed that individuals to whom others turned on issues related to vision, collaboration, and innovation often lacked confidence in the district's capacity for broad-based and skillful leadership. The data also revealed that such confidence was greatest among the senior-most sub-group, who from atop the organization assessed the current state of capacity more optimistically than did the other sub-groups. The support staff was half as confident as its bosses in the degree of capacity that existed within the administrative team.

In terms of the way that the SNA affected attitudes of the district's senior leadership concerning ways of working, organizing, interacting, and leading, the data revealed a prevailing sentiment that current ways of doing business were not all that ineffective and, in some cases, were favored. To a limited extent, efforts were being undertaken to enhance capacity within the organization, and there was broad recognition that more needed to be done to involve the COSS sub-group.

Insufficient data were obtained to answer the final question with sufficiency and confidence. While it was recognized that SNA offered a unique tool for organizational analysis and discovery, there was no explicit connection made between the SNA results and the ways these results could be leveraged to solve the problems surfaced by the district's leadership as inordinately challenging.

5. Findings

Employing the insights just summarized, the researchers returned to the inter-related theoretical underpinnings of the study, which included organizational and leadership theories and their evolution, constructivist leadership and its sub-set of leadership capacity, complexity theory, and network theory, and drew out the findings that follow.

5.1 Finding 1—Hierarchical or formal structures continue to hold sway

Breaking free of old habits is difficult. The data revealed that while efforts such as Professional Learning Communities were being undertaken to yield the benefits of collaboration and shared leadership, nonetheless the default response to most situations was to rely on existing structures and ways of working. Yukl (2012) concluded that organizations continue to privilege hierarchical structures and heroic leadership because they conform to the prevailing and unchallenged worldview that leadership equals leader, a form of circular logic from which it is difficult to break free.

A less polemical reason for viewing leadership heroically is the need for simplicity. The human tendency is to systematize the complex world and to "exaggerate the importance of leaders in order to explain events in a way that fits [their] assumptions and implicit theories" (Yukl, 2012, p. 449).

The need for simplicity and rationality leads inexorably to the last and most compelling reason organizations cling to outmoded visions of leadership: the demand for accountability. The need for accountability carries with it the onerous implication that the formal leader can touch everything and shape all outcomes, which are tenuous and even dangerous assumptions to make.

Based on the data derived from this study, the school district implicitly defaulted to its formal structure in which there were clear lines of demarcation between the central office, the schools, and the supporting staff. It did so despite explicit efforts, such as adoption of PLCs, designed to break down silos or barriers between and among key sub-groups.

5.2 Finding 2—"Birds of a feather" do flock together

Repeatedly in the ORA network visualizations, there was a clear pattern of individuals in similar roles, at similar levels within the organization, favoring each other in their interactions. This sub-group cliquishness supported what Krebs and Holley (2006) characterized as "two simple, yet powerful driving forces [within networks]: (a) Birds of a feather flock together; and (b) those close by, form a tie" (p. 4).

In the extreme, according to Krebs and Holley (2006) such clustering is both bad and good. On the negative side, there is little or no diversity within each cluster. On the up side, "the dense connections, and high degree of commonality forms good work groups—clusters of people who can work together smoothly" (p. 5). The school district capitalized on the benefits associated with formal teaming by actively cultivating communities of practice and learning. At the same time, it recognized that further work needed to be done to overcome fragmentation, isolation, and cliquishness that were made more explicit through SNA.

5.3 Finding 3—Transparency, trust and collaboration are deeply inter-dependent and underpin capacity

One study participant noted that in the physical world capacity is a measure of volume. If the ability to achieve greater volume is impaired, then so too is capacity. Transparency, trust, and collaboration all contribute to capacity and were, to some degree, impaired within the district.

Lencioni (2002) cited lack of trust or an unwillingness to be vulnerable to others as one of five dysfunctions of a team that can debilitate its ability to achieve optimal performance. Seen another way, dysfunction, especially dysfunction that can be remedied, shows a lack of skill, and skillfulness is essential to leadership capacity-building (Lambert, 2003).

In order to enhance skillfulness, transparency is necessary; otherwise, organizations run the risk that their collaborative efforts will seem superficial, as was the perception within the district. The potential value of a tool like SNA is its ability to make the inner workings of an organization more transparent and, as a result, guide and shape those inner workings with greater precision (Cross & Parker, 2004; Krebs & Holley, 2006). Still, even as SNA can create greater transparency, it also depends on transparency. In this study, the names were anonymized to protect the identities of those participating. In so doing, the full power of the application was diminished. A lack of comfort being vulnerable with each other meant that full transparency was not achieved. This condition, in turn, meant that collaborations (connections) could not be assessed fully for their strengths and weaknesses. Weak connections could not be strengthened; bad connections could not be fixed; new and necessary connections could not be created, etc.

It was noted earlier that capacity is complexity and vice versa. A fully-networked organization is more complex than a hierarchical one (Bar-Yam, 2004; Kelly, 2003); therefore it follows that deliberative efforts, informed by SNA, to flatten the organization and expand, energize, and shape network ties will result in expanded capacity. This ongoing process starts with trust—the willingness to be vulnerable to others (Lencioni, 2002), which is a form of transparency—that in turn leads to greater transparency, smarter, more informed decisions, and enriched interactions and strengthened collaboration.

5.4 Finding 4—Social networks are the organization, making SNA an essential diagnostic and decision-making tool

The data gathered during this study, especially through interview responses and direct observation, made clear that the district's leadership team left many potentially powerful social interactions to chance. It did so because such interactions were largely invisible to them. According to Bar-Yam (2004), complex entities are characterized by emergence, "the relationship between the details of a system and the larger view" (p. 27) and interdependence, the notion that every part of a system is integrally connected to another. The tendency is to see organizations by their complete outward manifestation, often captured by their formal organization chart. Yet solving organizational problems typically requires seeing them in terms of the complex interactions of their discrete parts. Both views are necessary but it is the second one that is often overlooked (Cross and Parker, 2004).

Another way of explaining emergence is "where local interactions lead to global patterns" (Krebs & Holley, 2006, p. 3-4). In other words, by understanding discrete connections, and energizing them in intentional ways, leaders can guide the patterns that emerge at the organizational or global level. "Instead of allowing networks to evolve without direction, successful individuals, groups and organizations have found that it pays to actively manage [their] network" (p. 5).

Social Network Analysis (SNA), therefore, becomes an absolutely essential tool for organizational health and performance, just as an x-ray is indispensible in ensuring human health. SNA provides a diagnostic tool that allows leaders and organizations to peer beyond the surface of their organization and make decisions designed to make it healthier and smarter.

5.5 Heuristic arising from the findings

The data analysis and findings made possible an integrating heuristic, presented in Figure 5. Collaboration, trust, and transparency create the environment in which candid conversations and meaningful connections can occur. These conversations and connections begin in the core of the network and expand outward to the periphery. They are ongoing and smartly managed by all, but especially by the formal leaders of the organization. Shared vision backgrounds everything and serves to bind, coalesce, and focus these conversations and connections across all levels, teams, sub-groups, and stakeholders. Capacity expands as a result of deliberate, ongoing, focused conversations and connections, within an open and encouraging environment, and shaped by vision.

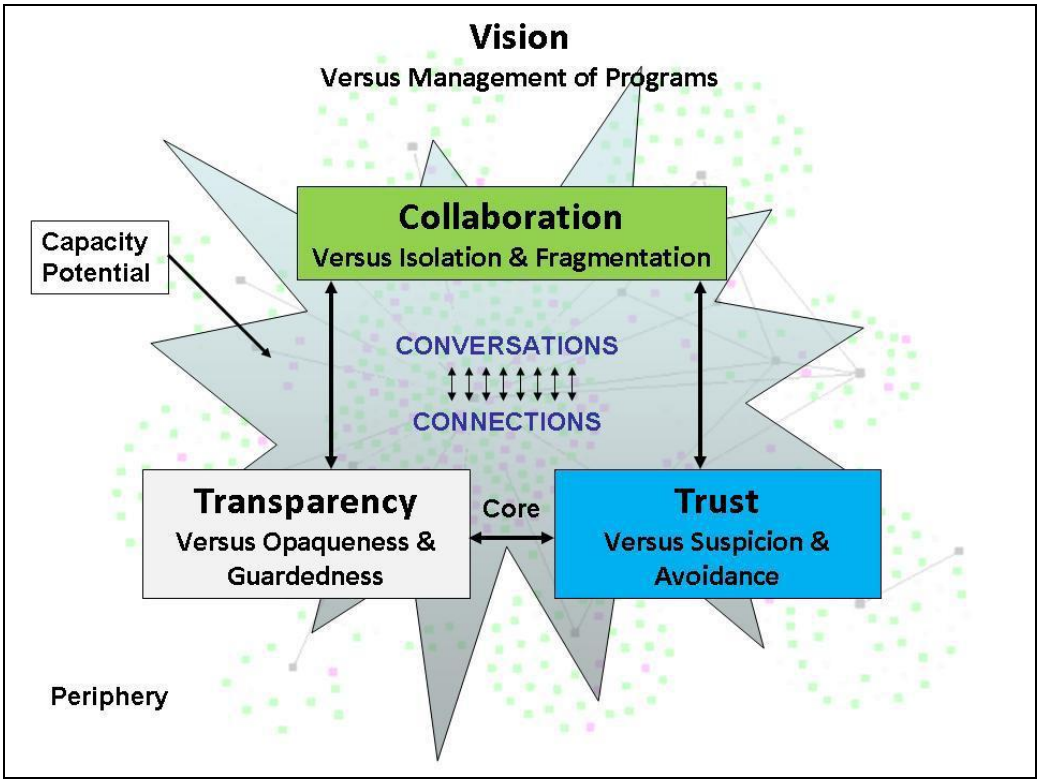

Figure 5: Leadership capacity integrating heuristic

6. Implications for Practice

Complex challenges confront educational leaders in the Information Age, leading to the question: If the current global environment is indeed chaotic and uncertain, if complexity underpins every system and process and if determinism is no longer consistently operative, what are educational leaders to do? In reply, five strategies, derived from the literature, addressed the need to rethink the ways in which leadership is enacted. These five strategies offer a worthwhile platform for redefining practice in the 21st Century.

6.1 Think more complexly

This study revealed that organizations tend to default to the status quo when it comes to structures and leadership. Despite efforts to enact more democratic or decentralized leadership, such as Professional Learning Communities, organizations still find it difficult to break free of the hierarchical structures that formally define them and discover that sweet spot on the continuum between rigid hierarchies and leaderless networks (Brafman & Beckstrom, 2006). Breaking free and finding this "sweet spot" are essential in an age that is increasingly inter-connected and flat.

Drath (2003) stated that the first step to dealing with complex problems may, at first, seem counterintuitive: to create even more complex capacity. "A complex capacity to respond means something different from just a more complicated process. It means a more varied, less predictable, more layered process capable of greater subtlety" (p. 6). How might educational leaders create this complex capacity? Cultivating acceptable patterns will invariably lead to a more

networked organizational structure, and leaders must be quick to embrace the network structure and its benefits, even as they work to minimize its shortcomings, such as dealing with accountability. What leaders today can ill afford is to revert back to default structures that prevent transparency, mitigate trust, and diminish collaboration.

6.2 Let go

Counter-intuitively, letting go is not about less work but more. It is not about simply formulating programs and then decentralizing their implementation. Nor is it a laissez-faire approach to leadership. It is about letting go of ego and power trips, shedding inhibitions, and inviting broader participation in problem solving and sensemaking. In terms of practice, letting go starts with a compelling vision—a narrative that unifies every action and activity and enables this sensemaking. It becomes the lens through which meaning arises in acceptable forms. Creating such a vision is a difficult task but must be given the time and resources needed to make it happen.

6.3 Expand capacity at all levels

Letting go cannot happen without the complementary action of expanding capacity. One must let go in order to create the conditions by which capacity can expand and by expanding capacity, one is able to let go more readily.

One Central Office Administrator in this study stated that if interactions were at their highest level, no work would get done because people would be constantly interacting and talking. Yet according to constructivist leadership, interactions and conversations enable the construction of meaning and learning, whether among students or among adults (Lambert, 2002). As was noted in the Findings, interactions and conversations are the organization; they are its essential work and business. The key to expanding capacity is to manage and focus the conversations and shape the connections in deliberate and disciplined ways. Social Network Analysis becomes a powerful and essential tool for managing capacity-building activities.

6.4 Move toward profound simplicity

Weick (2008) argued that dealing with complexity requires persistent sense-making: "sensemaking is dynamic and requires continuous updating and reaccomplishment. As a leader, don't let people languish in the feeling, 'Now we have it figured out.' They don't have it figured out" (*Leadership when*, ¶ 6, bullet 6). Dealing with the inexplicable is about talking as you go, in the form of stories that describe what is being faced and how to deal with it. Profound simplicity means allowing these stories to unfold.

Here again, SNA provides a tool to start meaningful and informed conversations about how members of an organization habitually interact. Sensemaking and discovery are both affected by who is contributing to the conversation. The more perspectives that are included in the discovery process, the more transparent and fully-faceted the arrived-at solutions will be. Seen another way, SNA can be viewed as a profoundly simple way to view organizations. Through the

examination of simple nodes and lines (edges), organizations begin to tap into and make sense of profoundly complex human dynamics.

6.5 Start small

Social network analysis offers a first step towards understanding and harnessing invisible energy within an organization, energy that comes about as a result of social interactions, large and small. By employing a tool like ORA, educational leaders can begin to make these invisible force fields more explicit and align them with the vision of the organization. In so doing, the skill with which the work of leadership is accomplished is sharpened and broadened, expanding capacity to such a degree that the complex challenges confronting educational institutions can be met head on with greater hope of mastering them.

7. Conclusion

The challenges confronting humans today in all fields of endeavor are complex in their nature. Educational institutions are faced with demands for improved student achievement against a backdrop of reduced revenue streams, increased diversity, mounting social challenges, changing demographics, and rising teacher attrition. Faced with these challenges, along with the impact of advancing technology and social media, new forms of leadership are becoming imperative. Bar-Yam (2004) and Drath (2004) both noted that in order to survive within complex environments, organisms must themselves become complex. Kelly (2003) posited that the pure network was the most complex social configuration possible, while Brafman and Beckstrom (2006) recognized that fully-networked, leaderless organizations are more theoretical than practical. Instead, organizations fall along a continuum between pure hierarchies and pure networks. In the Information Age, organizations need to move along the continuum closer to the pure network and find their sweet spot there.

Becoming a more networked organization demands new forms of leadership. Bolman and Deal (2003) revealed that over time the ways in which organizations were understood have evolved from structural to symbolic, and the type of leadership needed for each has also evolved. Hierarchies and heroic leadership worked when organizations were viewed structurally. Now that organizations are viewed symbolically as hives or networks, heroic leadership can no longer work. Constructivist leadership and its subset of leadership capacity were examined as offering the type of leadership needed for organizations that today operate amidst complexity.

This study sought to examine the ways in which an Information Age tool, Social Network Analysis, could be employed to expand leadership capacity and move an organization along the continuum towards being fully networked. What the study discovered is that inertia continued to keep the school district leadership team under study from breaking free of its formal structures, despite its best intentions to open up lines of communication. The results indicated that participants continued to align themselves with like others and in so doing created isolation and fragmentation. The study found that transparency, trust, and collaboration were all, to varying degrees impaired, and thus hampered the

expansion of capacity necessary to become more networked. Finally, it found that human connections are the core of the organization and that many of these connections and interactions were left to chance because they were unknown. The power of SNA is the ability to uncover these interactions and manage them smartly.

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